



Online Resource 5 a,b) Comparing the intrinsic distances between receptor cells, local and ascending neurons for a temporal resolution of A) 3 ms ($P < 0.001$; Kruskal-Wallis-test; REC-LN: $p = 0.235$; REC-AN: $p < 0.001$; LN-AN $p < 0.001$; Mann-Whitney-U *post hoc* comparisons). B) 10 ms ($P < 0.001$; Kruskal-Wallis-test; REC-LN: $p < 0.006$; REC-AN: $p < 0.001$; LN-AN $p = 0.001$; Mann-Whitney-U *post hoc* comparisons). c,d) Comparison of the slopes between the three computation levels for a temporal resolution of c) 3ms ($P < 0.001$; Kruskal-Wallis-test; REC-LN: $p = 0.708$; REC-AN: $p < 0.01$; LN-AN $p < 0.001$; Mann-Whitney-U *post hoc* comparisons) d) 10ms ($P < 0.001$; Kruskal-Wallis-test; REC-LN: $p = 0.620$; REC-AN: $p < 0.01$; LN-AN $p < 0.001$; Mann-Whitney-U *post hoc* comparisons); $N = 13$ (REC), 42 (LN) 34 (AN).

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author names: Daniela Neuhofer, Martin Stemmler, Bernhard Ronacher

affiliation and e-mail address of the corresponding author:

Department of Biology

Humboldt-Universität zu Berlin

Invalidenstrasse 43

10115 Berlin

Germany

neuhofda@cms.hu-berlin.de